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☐ 1: Reg Anesth Pain Med. 2004 May-Jun;29(3):201-5.



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### Injection pressures by anesthesiologists during simulated peripheral nerve block.

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**BACKGROUND AND OBJECTIVES:** Anesthesiologists typically rely on a subjective evaluation ("syringe feel") of possible abnormal resistance to injection while performing a peripheral nerve block (PNB). A greater force required to perform the injection is believed to be associated with intraneural injection. The hypothesis of this study is that anesthesiologists vary in their perception of "normal" injection force, that the syringe feel method is inconsistent in estimating resistance, and that needle design may affect the injection force. **METHODS:** Thirty anesthesiologists were asked to inject a local anesthetic, as they would in their everyday practice, through a commonly used syringe and needle assembly. Injection force was measured using an in-line manometer coupled to a computer via an analog-to-digital conversion board. In addition, injection force at clinically relevant injection speeds was determined using 3 differently sized needles from 4 different manufacturers. **RESULTS:** During a steady injection rate, all anesthesiologists perceived an increase in the force required to inject, even with minor pressure changes (0.6 +/- 0.3 psi). However, the 30 anesthesiologists, 21 (70%) initiated injection using a force that resulted in pressures greater than 20 psi; 15 (50%) used a force greater than 25 psi, and 3 (10%) exerted pressures greater than 30 psi. Pressures varied as much as 20-fold among needles of the same gauge/length from different manufacturers ( $P < .01$ ). **CONCLUSIONS:** Anesthesiologists vary widely in their perception of appropriate force and rate of injection during PNB. The syringe-feel method of assessing injection force is inconsistent and may be further affected by variability in needle design.

PMID: 15138903 [PubMed - indexed for MEDLINE]

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